



Precise Performance

Do Citizens Rely on Numerical Precision as a Cue of Confidence?

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Precise Performance: Do Citizens Rely on Numerical Precision as a Cue of Confidence?

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Abstract

Recent research suggest that precise numbers signal confidence and are more potent anchors. Political-administrative systems are often dominated by numerical information in order to evaluate performance or set future goals. We conduct a set of experiments testing how well the precision effect translates in political-administrative setting (n=1,505). The findings provide no clear convincing evidence of a precision effect. Citizens evaluation of performance goal numbers seem to be largely unaffected by the roundness or precision of a number. This is the case even if the numerical information is presented without any explicit political cues or are framed as non-manipulative expert judgments.

KEYWORDS: performance management · numerical cues · social attribution

Word count: 3,950 (including references and appendices)

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“A false impression of accuracy can be created by quoting statistics in greater detail than is warranted by their precision or by overloading indicators with detail. [...] often used by politicians to impress with their grasp of detail...”

– Robert V. Horn (1993: 18)

Politics and administration are often a battle over numbers. Political-administrative actors state all sorts of facts, expectations, forecasts, or goals in order to win political arguments and gain support for their policies (Prewitt, 1987). Some have suggested that politicians might benefit from inflating their stated confidence about outcomes (Wildavsky, 1964; Radzevick & Moore, 2011). Recent research point to that one way of increasing others’ confidence in numbers is by using precise numbers (Janiszewski & Uy, 2008; Thomas et al. 2010; Mason et al., 2013; Jerez-Fernandez et al., 2013; Zhang & Schwarts 2013). For instance, Mason et al.(2013) find that precise offers in negotiations are perceived as more informed which prompts less adjustment away from precise offers compared with round ones. In general, using any type of number has been found to boost citizens competence rating of politicians (Pedersen, 2017), even though performance information research find that citizens themselves are more affected by episodic information than statistical information in their overall performance assessment (Olsen, 2017).

In political-administrative settings, politicians and managers are the producers of numbers while citizens are the potential receivers (Yanic & Foster 1995; 1997; Radzevick & Moore 2011). If individuals prefer precise estimates it gives number producers strong incentives to supply precision (Radzevick & Moore 2011; Jerez-Fernandez et al. 2013). If citizens prefer precision over vagueness it has very straightforward implications for how politicians should use numbers: be as precise as possible. Overly confident people tend to gain more influence (Koehler et al. 2002) and this effect could extend into politics. The open question is if “misplaced concreteness” (Horn, 1993: 18) and “specious accuracy” (Morgenstern, 1950: 3) in the form of precise political-administrative numbers can affect citizens in the same way as found in the market place?

In this article, we bring the recent insights on number precision in a market setting into the

realm of politics. Across a set experiments we test how precise political-administrative numbers affect citizens trust in forecasts, confidence in political-administrative decisions, and the likelihood of achieving future performance goals. The paper hereby adds to the discussion in performance management on the use and effect of performance data and goals (Moynihan 2005; Rutherford and Meier, 2016) and provides a potential piece in the puzzle of why managers use not only performance data but even highly precise performance metrics (Moynihan and Pandey 2010).

Should we expect citizens to view precise political numbers as cue of confidence? Zhang and Schwarts (2012; 2013) find that the precision effect depends on the receivers beliefs about the producers cooperativeness. That is, precision has no effect if the producer is viewed as untrustworthy, self-interested, or incompetent. They draw on Grice (1975) conversational logic which state that speakers apply a level of precision which reflects the accuracy of their knowledge. Hence the conversational norm in corporative conversations is to use less precision if uncertainty surround a numerical value.

In a market place setting sellers or buyers might suspect that the conversational norms are broken in order achieve certain goals by signaling a high degree of certainty (Mason et al. 2013). Mason et al. (2013) speculate that precision can backfire if the receiver of judgment questions the producers motives or expertise. There are also good reasons for citizens to be skeptical about the numbers which policy makers present. Previous research highlight that politicians can exploit cognitive biases in citizens processing of numbers (Krishna & Slemrod, 2003; Malhotra & Margalit, 2010; Olsen, 2013a; 2013b).

Data on Three Experiments

The precision effect is tested across three independent experiments embedded in a single survey. Respondents for the survey were recruited via YouGov's Danish online panel (n=1505). All respondents are between the age of 18 to 74 and the sample is highly diverse in terms of age ($M = 51.0$, $SD = 14.8$), gender (49.6% female), education, and political party identification. Following an introductory screen the respondents were randomly assigned to two of the three different ex-

periments. The respondents were split in two groups for experiment 1 and 2 while all respondents were assigned to one of multiple conditions in the third experiment.

Experiment 1: Choosing among Economic Predictions

Governments and many other actors produce a large amount of forecast about economics and fiscal performance of political jurisdictions. Point of departure for the first experiment is to test if citizens have greater trust in precise numerical forecasts compared with less precise ones?

Method

One half of the participants ($n=749$) were asked to choose between two different predictions about three different dimensions of the Danish economy in 2014. They were asked to choose the one they trusted the most. The dimensions covered (a) economic growth rate, (b) reduction in the number of unemployed, and (c) the state budget deficit. Participants were randomly assigned to one of two conditions of the three dimensions. In the first condition the two predictions were a round number and a precise number slightly below the round numbers. For economic growth 1.5% and 1.463%, for number of unemployed: 10,000 people or 8,750 people, and for the state budget deficit 20 billion (DKK) and 19,63 billion (DKK). In the second condition the participants got the same round number along with a precise prediction of equivalent distance but slightly above the round estimate. All in the same order of magnitude as in the lower precise condition. The order of sequence of the three prediction topics was also randomized.

Results

The overall results of the experiment is reported in figure 1. For the growth rate 51.6 pct. prefer the lower estimate of 1.463% over 1.5% (Exact binomial test ($n=368$), $p = .56$). However, 76.4% prefer 1.5% if paired with the higher precise estimate (Exact binomial test ($n=381$), $p < .001$). For the case of unemployment reduction 72.8% pick the lower precise estimates over the round

(Exact binomial test ($n=381$), $p < .001$). However, 78.5% picked the round estimate when paired with a higher precise estimate (Exact binomial test ($n=368$), $p < .001$). Finally, for the state budget deficit there was a preference for the round estimate. When paired with a lower precise estimate 54.9% chose the round estimate of 20 billion (Exact binomial test ($n=381$), $p = .068$) and when paired with a higher precise estimate 57.7% picked the 20 billion (Exact binomial test ($n=368$), $p = .003$). In summary, across all three scenarios no evidence point to that respondents mostly trust the precise estimate over the round one. In fact, respondents mostly choose the estimate with a negative outlook on the economy and with slight preference for round estimates. The former might indicate some motivated reasoning in numerical interpretation with a directional goal to discredit the current government (Baekgaard and Serritzlew 2016).

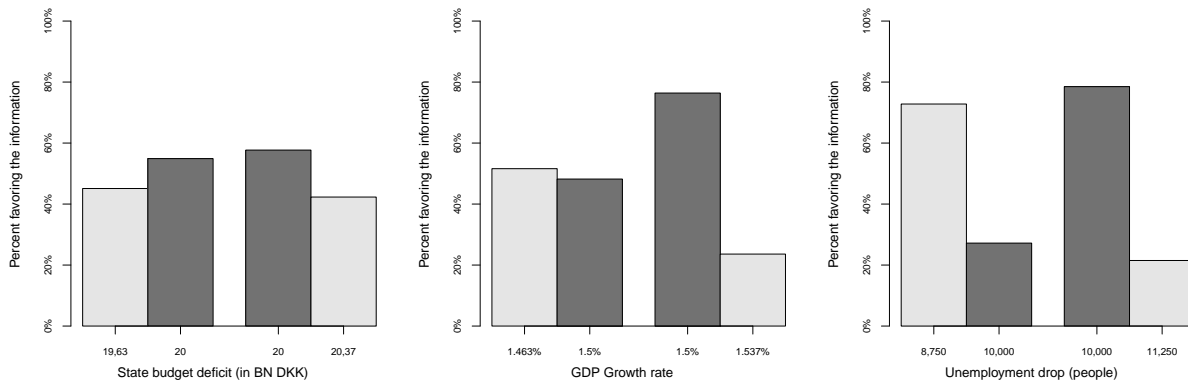


Figure 1: Do citizens prefer precise or round forecasts of the economy? (N=750)

Experiment 2: Confidence in Policy Information

In the second experiment we test how citizens rate their confidence in political-administrative numbers if precise and round estimates are evaluated in isolation. Asking respondents to rate their confidence in precise and round numbers is inspired by Jerez-Fernandez et al. (2013).

Method

Half of the participants ($n=756$) were asked to evaluate the information which informs various political decisions. They were asked to rate their degree of confidence in the correctness of the

information on a 11-point scale which ranged from 0 (no confidence) to 10 (Very much confidence). They provided their rating for three different pieces of political information. The first condition contained political information with a round number while the second condition contained a precise number drawn from a pre-defined uniform distribution narrowly centered around the round number.

One policy information stated that “*The budget unit finds that the municipality needs to save 1,000 DKK per capita.*”. In the precise condition the DKK amount was randomly drawn from a uniform distribution ranging from 901 DKK to 1,099 DKK (excluding 1,000 DKK). Another policy information was that “*Experts find that economic growth in Denmark will be at 1.5% in 2014*” with precise estimates ranging from 1.401% to 1.599% (excluding 1.5%). Finally, a statement stated that “*The Government expect the unemployment rate will decrease by 10.000 people in 2014*” with precise estimates ranging from 9,001 to 10,999 (excluding 10.000). The order of presentation of the scenarios was also randomized and participants receive only three precise estimates or three round estimates.

Results

Results of all three scenarios is shown in figure 2. First, for the municipal budget cuts the average confidence is 4.7 for both precise and round estimates ($t(754) = .38$, $p = .70$, $d = 0.06$). Second, for the decrease in unemployment average confidence is also not significantly different at 3.8 for both frames ($t(754) = .42$, $p = .67$, $d = 0.08$). Finally, for the case of the growth rates respondent have significantly more confidence in the round estimate ($M = 5.2$, $SD = 2.2$) than the precise one ($M = 4.8$, $SD = 2.3$), $t(754) = 2.5$, $p = .013$, $d = 0.42$. Across all three scenarios we find either no difference between respondents confidence in precise and round estimates or in fact a higher degree of confidence in round estimates.

Experiment 3: The Likelihood of Achieving Policy Goals

Long-term policy goals seem to play an important role in politics. However, citizens may be skeptical about politicians ability and willingness to achieve goals that are beyond their own electoral

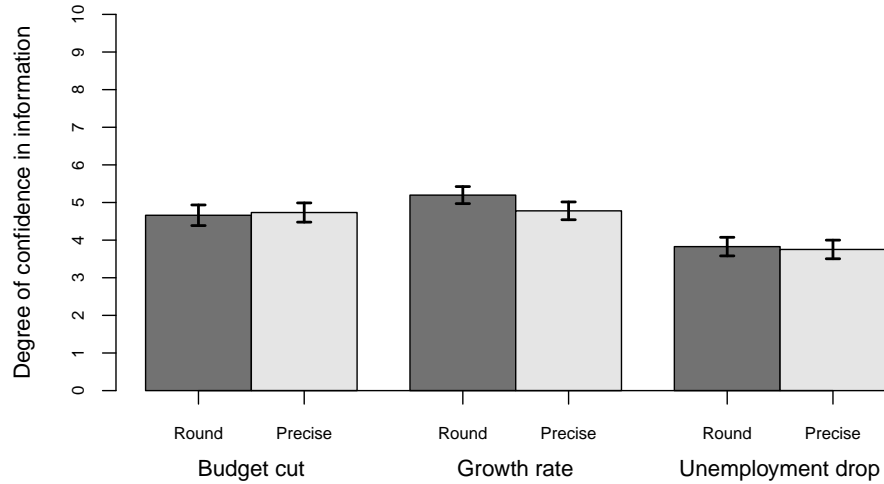


Figure 2: Evaluation of the information which informs political decisions. How much confidence do you have in the correctness of this information? 11-point scale which ranged from 0 (no confidence) to 10 (Very much confidence). Error bars indicate 95%-confidence intervals. N=756.

career. In addition, these simple quantifiable goals often measure complex societal outcomes which can be difficult to affect, e.g., national wealth, the educational level of the population, or human health etc. In the final experiment we induce both more ambiguity and uncertainty into the political numbers by looking at long term policy goals. In addition, we also vary the communicators expertise and potential manipulative interests in presenting the numbers (Zhang & Schwatz 2012; 2013).

Method

All participants (n=1505) were assigned to one of two descriptions outlining how politicians set policy goals. The first framed emphasized that many policy goals often are set with the purpose of convincing the electorate: *“The political goals are often set with the help from political consultants who knows how to convince voters.”*. This frame was intended to induce the idea that policy be manipulative and non-cooperative. The second frame emphasized the scientific soundness of many policy goals: *“The political goals are often set with the help from scientific experts who have great professional knowledge about the topics.”* This frame aimed at highlighting how policy goals can rest on expert judgment with non-manipulative intend. Given the existing research we would expect

that precise policy goals only affect citizens more if they are provided by non-manipulative humans with some expertise (Zhang & Schwatz 2012; 2013).

Participants read three policy goals in random order. For each frame participants were either assigned three policy goals with a round number or three policy goals with a precise number. The participants were also only assigned to either manipulative or expert frames. The goals varied in terms of policy area and goal precision. The three goals in the round number frame were: (a) “By 2020 renewable energy must make up at least 30% of the total energy consumption., (b) By 2020 public service expenditure must make up no more than 25% of the total economy, and (c) By 2020 employment must be increased by at least 200.000 people. In the precise frame the numbers were drawn from a predefined distribution of round numbers in order to make the results robust the different types of “precise” numbers. The energy policy goal was drawn from the interval 29.01% to 30.99% and reported with two decimals (e.g., 29.67%). The public expenditure interval was 24.01% to 25.99% and also reported with two decimals (e.g., 25.34%). Finally, the employment goal was restricted to the interval of 191,001 to 209,999. Participants were asked to rate the likelihood of achieving the stated policy goals on unnumbered slider scale (101-point scale ranging from 0 indicating “Not at all likely” to 100 “Very likely”).

Results

The overall results of the experiment is reported in figure 3. On average citizens assign greater likelihood to the goals of renewable energy ($M=58.4$, $SD=22.4$) than in the two different economic goals (employment: $M=40.6$, $SD=21.4$; public expenditure: $M=42.7$, $SD=19.3$). This fits the idea that energy policy is less politicized in Denmark. For all three scenarios we conducted a 2 (numbers: round vs. precise) \times 2 (frame: manipulative vs. expertise) between subjects ANOVA with an interaction. For the case of the renewable energy goal there is no significant interaction effect ($F(1, 1501) = .59$, $p = .44$) but some evidence of significant main effects in the opposite direction ($F(1, 1505) = 3.11$, $p = .078$). For the employment numbers there is also no significant interaction effect ($F(1, 1501) = 1.16$, $p = .28$). There is a small positive main effect of receiving the expertise

frame ($F(1, 1501) = 4.7, p = .029$), but no main effect of number precision ($F(1, 1501) = 0.02, p = .90$). Finally, for the case of the public expenditure goal there is again no significant interaction effect ($F(1, 1501) = .19, p = .66$). There is also no main effect of the expertise frame ($F(1, 1501) = .80, p = .37$). However, we do find a positive main effect of number precision on citizens likelihood evaluation ($F(1, 1501) = 8.42, p < .01$). On average precise public expenditure goals receive an evaluation of 44.1 ($SD = 18.7$) while round. However, we should take these results with some skepticism as the main effect of manipulative vs. expertise frame is close to zero which could indicate that the study failed to manipulate the cues about the information provider. This being said, most responded were able to recall the correct information provider ¹

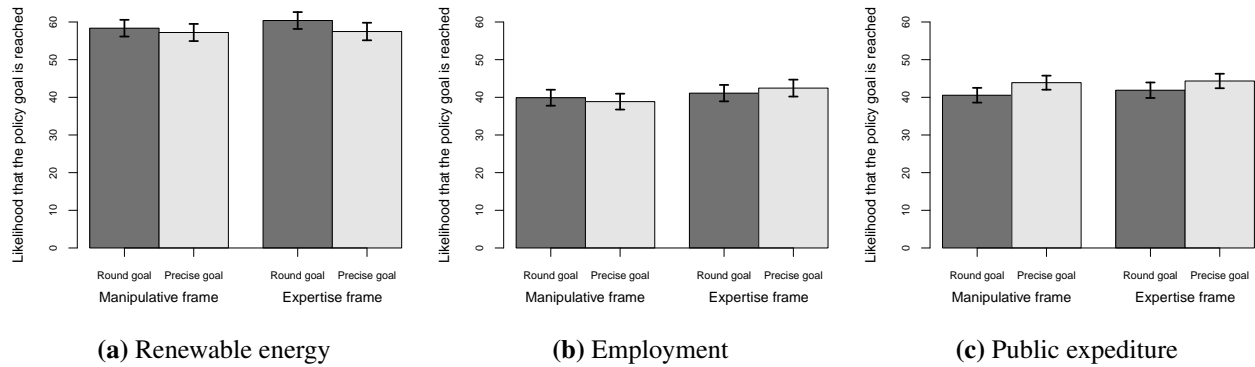


Figure 3: The likelihood of achieving the stated policy goals. A 101-point scale ranging from 0 indicating “Not at all likely” to 100 “Very likely”. Error bars indicate 95%-confidence intervals. N=1505.

Discussion and Conclusion

The three experiments reported on here aimed at extending research on number precision as a confidence cue in a political-administrative setting (Janiszewski & Uy 2008, Thomas et al. 2010, Mason et al., 2013, Jerez-Fernandez et al., 2013, Zhang & Schwarts 2013). Across all experiments, including multiple different scenarios, we found no clear evidence of a precision effect in politics.

¹ At the end of the survey participants were asked to recall who usually provided politicians with goals according to the question they were exposed to earlier on. A list was provided with the two actual treatment options (political advisors or scientific experts) along with two unmentioned sources (party members and politicians from other countries) and a don't know option. 57,9% or 872 respondents provided a correct recall of the treatment they got. The substantial results of the interaction effects are not altered if only those reporting the right recall are included in the analysis.

In most instances the respondents did not rely on the roundness or precision of the numbers in their judgment. Citizens do not report greater trust or confidence in precise political numbers. They do not judge precise performance goals to be more likely to be achieved. And the effect does not depend on the motives of the goal provider as found in a market setting (Zhang & Schwartz 2012; 2013). Only for the case of numerical goals for future public expenditure did we find evidence of a small precision effect. It can be argued that the public expenditure measure is more difficult to encode and less often discussed in political debates. This may indicate that precision can play a role for numerical measures where citizens are more politically ambivalent.

This is by no means a definitive study of precision in political-administrative settings. A possible explanation for the null finding may be that participants did not accept that the estimates were produced by another human which is important for a social attribution explanation (Zhang & Schwartz, 2012; 2013; Jerez-Fernandez et al., 2013). That is, we could suspect that citizens which actively interact with others to seek out political advice would be more vulnerable to a precision effect. However, the findings do suggest that precision cues are fragile outside of a market setting. This points to that future research should look more into how the absence or presence of other cues crowds out the precision of a number as a relevant cue for citizens, voters, buyers, and all the other important roles in which humans on a daily basis make judgment about numerosities.

References

- Bækgaard, Martin, and Søren Serritzlew. 2016. Interpreting performance information: Motivated reasoning or unbiased comprehension. *Public Administration Review* 76(1): 73-82.
- Grice, H. P. (1975). Logic and conversation. In P. Cole, & J. L. Morgan (Eds.), *Syntax and semantics*, 3: Speech acts (pp. 41–58). New York, NY: Academic Press.
- Horn, Robert V. (1993). *Statistical Indicators: For the Economic and Social Sciences*. Cambridge University Press.
- Janiszewski, C., & Uy, D. (2008). Precision of the anchor influences the amount of adjustment. *Psy-*

chological Science 19(2): 121–127.

Malhotra, N., & Margalit, Y. (2010). Short-term communication effects or longstanding dispositions? The public's response to the financial crisis of 2008. *The Journal of Politics* 72(3): 852–867.

Morgenstern, O., & Princeton University Press. (1963). On the accuracy of economic observations (Vol. 2). Princeton: Princeton University Press.

Moynihan, D. P. 2005. Goal-based Learning and the Future of Performance Management. *Public Administration Review* 65(2): 203–216.

Moynihan, D. P., & Pandey, S. K. 2010. The big question for performance management: why do managers use performance information? *Journal of public administration research and theory*.

Loschelder, D. D., Stuppi, J., & Troetschel, R. (2013). “14,875?!”: Precision Boosts the Anchoring Potency of First Offers. *Social Psychological and Personality Science* 5(4): 491–499.

Koehler, D. J., L. Brenner, & D. GrifñAñ. 2002. The calibration of expert judgment: Heuristics and biases beyond the laboratory. T. Gilovich, D. GrifñAñ, D. Kahneman, eds. *Heuristics and Biases*. Cambridge University Press, Cambridge, UK, 686–715.

Krishna, A., & Slemrod, J. (2003). Behavioral public finance: Tax design as price presentation. *International Tax and Public Finance* 10(2): 189–203.

Thomas, M., Simon, D. H., & Kadiyali, V. (2010). The price precision effect: Evidence from laboratory and market data. *Marketing Science* 29(1): 175–190.

Olsen, A. L. (2013a). The politics of digits: evidence of odd taxation. *Public Choice* 154 (1-2): 59–73.

Olsen, A. L. (2013b) Leftmost-digit-bias in an enumerated public sector? An experiment on citizens judgment of performance information. *Judgment and Decision Making* 8(3): 36–371.

Olsen, A. L. (2017). Human Interest or Hard Numbers? Experiments on Citizens' Selection, Exposure, and Recall of Performance Information. *Public Administration Review* 77 (3): 408–420.

- Pedersen, R. T. (2017). Politicians Appear More Competent When Using Numerical Rhetoric. *Journal of Experimental Political Science* 4(2): 129–150.
- Prewitt, K. (1987). Public statistics and democratic politics. In Alonso, W., & Starr, P. (Eds.), *The politics of numbers*. New York: Russell Sage Foundation Publications (pp. 261–274).
- Radzevick, Joseph R., & Don A. Moore. 2011. Competing to be certain (but wrong): Market dynamics and excessive confidence in judgment. *Management Science* 57 (1): 93-106
- Rutherford, A., & Meier, K. J. (2015). Managerial Goals in a Performance Driven System: Theory and Empirical Tests in Higher Education. *Public Administration* 93(1): 17–33.
- Yaniv, I., & Foster, D. P. (1995). Graininess of judgment under uncertainty: An accuracy-informativeness trade-off. *Journal of Experimental Psychology: General* 124(4): 424–432.
- Yaniv, I., & Foster, D. P. (1997). Precision and accuracy of judgmental estimation. *Journal of Behavioral Decision Making* 10(1): 21–32.
- Zhang, Y. C., & Schwarz, N. (2013). The power of precise numbers: A conversational logic analysis. *Journal of Experimental Social Psychology* 49(5): 944–946.
- Zhang, Y. Charles, & Schwarz, Norbert (2012). How and why one year differs from 365 days: A conversational logic analysis of inferences from the granularity of quantitative expressions. *Journal of Consumer Research* 39(2): 248–259.
- Wildavsky, Aaron B. 1964. *Politics of the budgetary process*. US: Little, Brown, and Company.

Appendix

Study 1: Experimental design

Please evaluate different predictions about the Danish economy in 2014.

Which one of these statements do you trust the most?

The economic growth rate will be: a) 1.463% or b) 1.5%.

The unemployment rate in Denmark will decrease by: a) 8.750 people or b) 10.000 people

The state budget deficit will end up at: a) 19.63 bio. (DKK) or b) 20. bio. (DKK).

Figure 4: Example screen from experiment 1

The screenshot shows a survey interface for YouGov. At the top, the logo 'YouGov' is in red, followed by the text 'What the world thinks' in grey. To the right of the text is a progress bar with a red segment and the label '8%'. Below this, the survey question is presented in Danish: 'Du bedes vurdere forskellige udsagn om den danske økonomi i 2014.' followed by 'Hvilket udsagn har du mest tiltro til?'. The specific statement being evaluated is 'Ledigheden i Danmark vil falde med:'. Below this statement are two buttons: '8.750 personer' on the left and '10.000 personer' on the right.

Study 2: Experimental design

Please evaluate the information which informs political decisions.

How much confidence do you have in the correctness of this information?

The budget unit finds that the municipality needs to save 1.000 DKK per capita.

Experts find that economic growth in Denmark will be at 1.5% in 2014

The Government expect the unemployment rate will decrease by 10.000 people in 2014

Figure 5: Example screen from experiment 2

YouGov What the world thinks 8%

Du bedes vurdere den information, som en række politiske beslutninger støtter sig til.

Hvor meget tillid har du til, at informationen i dette udsagn er korrekt?

Ekspertter vurderer, at den økonomiske vækst i Danmark bliver på 1,586% i 2014

☐ 0 – Slet ingen tillid

☐ 1

☐ 2

☐ 3

☐ 4

☐ 5

☐ 6

☐ 7

☐ 8

☐ 9

☐ 10 – Meget stor tillid



Study 3: Experimental design

The politicians set many goals for how Denmark should develop in the future.

The political goals are often set with the help from political consultants who knows how to convince voters.

OR

The political goals are often set with the help from scientific experts who have great professional knowledge about the topics.

How likely do you believe it is that the following goal is achieved?

By 2020 must renewable energy make up at least 30% of the total energy consumption.

By 2020 must public service expenditure make up no more than 25% of the totale economy

By 2020 must employment be increased by at least 200.000 people.

Figure 6: Example screen from experiment 3

YouGov What the world thinks 22%

Politikerne sætter mange mål for, hvordan Danmark bør udvikle sig i fremtiden.

De politiske mål er ofte blevet til med hjælp fra politiske rådgivere, der ved, hvordan man overbeviser vælgerne.

Hvor sandsynligt mener du, det er, at følgende mål kan opfyldes?

I 2020 skal vedvarende energi udgøre mindst 29,34% af det samlede energiforbrug

Slet ikke sandsynligt Meget sandsynligt